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72-5

An Announcement of
Highway Safety Literature
. . . A Bi-Monthly Abstract Journal

HSL No. 72-5 March 10, 1972 HS-010 573-HS-010 636 HS-800 596,600, &605, HS-810 187-188, HS-820 171

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THIS ISSUE CONTAINS:
HS-010 573-HS-010 636
HS-800 596,600, & 605
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U.S. Department of Transportation / National Highway Traffic Safety Administration

[redacted]

. . . A Bi-Monthly Abstract Journal

Published twice-a-month by the National Highway Traffic Safety Administration,
Research Institute, Office of Accident Investigation and Data Analysis
Washington, D.C. 20590

INTRODUCTION

Publications such as journal articles, proceedings, and research reports announced in *Highway Safety Literature* include some of the most recent additions to the collection of the NHTSA Scientific & Technical Information Service. Subject areas covered include all phases of highway, motor vehicle, and traffic safety, especially those encompassed by the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966.

Individual issues of *HSL* are numbered according to the year and the issue number within that year; thus, 71 designates the year and 1, 2, 3, etc. the individual issues. To aid the user in locating citations by the HS-number, the cover bears the inclusive entry number for each issue.

Entries in *HSL* are arranged according to the NHTSA Subject Category List shown in the Table of Contents. The list is a two-level arrangement consisting of five major subject fields subdivided into 59 subject groups. Documents related directly to the National Highway Traffic Safety Administration (NHTSA) are announced in a separate section headed NHTSA DOCUMENTS and are numbered in five distinct series: NHTSA Accident Investigation Reports (HS-600 000 series), NHTSA Compliance Test Reports (HS-610 000 series), NHTSA Contractors Reports (HS-800 000 series), NHTSA Staff Speeches, Papers, etc. (HS-810 000 series), and NHTSA Imprints (HS-820 000 series). For NHTSA DOCUMENTS in series HS-600 000 and HS-610 000, individual full case reports are available for inspection at the National Highway Traffic Safety Administration. HS-800 000 series and HS-820 008 series are available for purchase from NTIS or GPO (see page ii). Although announced together in a separate section, these documents are also assigned specific subject categories for machine retrieval.

A document which contains a number of separate articles is announced as a complete volume in the subject category most applicable to it as a whole. Entries for the individual articles appear in their most specific subject category.

SAMPLE ENTRIES

Subject Category Array

NHSB Accession no...... HS-800 218 Fld. 5/21; 5/9

Title of document......... AN INVESTIGATION OF USED CAR SAFETY STANDARDS--SAFETY INDEX: FINAL REPORT. VOL. 6 - APPENDICES G-L

Personal author(s)......... by E. N. Wells; J. P. Fitzmaurice; C. E. Guilliams; S. R. Kalin; P. D. Williams

Corporate author.......... Operations Research, Inc.

Collation

Publication date............ 1969 150p

Contract FH-11-6921

Report no. ORI-TR-553-Vol-6; PB-190 523

Abstract........................ Appendices G-L to this study of used car safety standards include: indenture model diagrams for classes I-IV motor trucks; degradation, wear, and failure data for motor truck classes I-IV; and safety index tables for classes I-IV motor trucks.

Search terms; Wear; Trucks. Failures; Used cars; Inspection' standards

AVAILABILITY: NTIS

HS-004 497 Fld. 5/19

AUTO THEFT THE PROBLEM AND THE CHALLENGE

by Thomas A. Williams, Sr.

Journal citation . . . Published in *FBI Law Enforcement Bulletin* v37 n12 p15-7 (Dec 1968)

Gives figures on the extent of the auto theft problem and comments on antitheft devices available now or in the planning stage.

Search terms: Theft; Theft protection; Stolen cars

[redacted]

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NOTE: Material published in Highway Safety Literature (HSL) is intended for the information and assistance of the motor vehicle and highway safety community. While brand names, equipment model names and identification, and companies may be mentioned from time to time, this data is included as an information service. Inclusion of this information in the HSL should not, under any circumstances, be construed as an endorsement or an approval of any particular product, course, or equipment by the U. S. Department of Transportation, National Highway Traffic Safety Administration.

Harry A. Feinberg
Managing Editor

AVAILABILITY OF DOCUMENTS
AND
INSTRUCTIONS FOR ORDERING

Articles and reports whose citations and abstracts appear in HSL are acquired from many sources, such as periodicals, journals, NHTSA Contractors' reports and NHTSA staff speeches, and other reports. Those reports other than NHTSA Contractors' reports and NHTSA generated reports and speeches (see introduction) are assigned a lower consecutive accession (HS-) number.

Department of Transportation personnel may borrow copies of publications announced in HSL from the NHTSA Technical Reference Division. Non-DOT Personnel, in the Washington, D.C. area, may borrow copies of publications for a 24-hour period only. Telephone (202) 426-2768. Government personnel in the Washington, D.C. area, use government ID phone 118-62768.

The names of the journals cited in HSL appear in italic type preceded by the word "Published in." The journal containing the article cited may be borrowed from most research and public libraries. Non-DOT personnel outside the Washington area should contact their company or agency libraries for assistance.

NHTSA Contractors' reports and other reports can usually be obtained as indicated under AVAILABILITY. However, there is no certainty that copies will be available for more than a limited period after a report is issued.

The more common availability sources are identified by symbols which are explained in the next column:

NTIS: National Technical Information Service, Springfield, Va. 22151. Order by accession number: HS, AD, or PB. Prepayment is required by NTIS coupon (GPO coupons are not acceptable), check or money order (made payable to the NTIS). PC (Paper copy; full size original or reduced facsimile) prices are $3.00 up to 300 pages, $6.00 for 301 to 600 pages, $9.00 for 601 to 900 pages, and over 900 pages will be quoted on request. Surcharge is added for foreign orders. MF (microfiche approximately 4x6" negative sheet film; reader required) is $0.95 per report.

GPO: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Give corporate author, title, personal author, and report number . Prepayment is required by GPO coupon (NTIS coupons are not acceptable), check or money order (made payable to the Superintentent of Documents).

HRB: Highway Research Board, National Academy of Sciences, 2101 Constitution Ave., N. W., Washington, D. C. 20418.

NHTSA: National Highway Traffic Safety Administration, General Services Division, Washington, D.C. 20591 (Telephone (202) 426-0874). Give HS-No.

SAE: Society of Automotive Engineers, Dept. HSL, 2 Pennsylvania Plaza, New York, N.Y. 10001. Order by SAE report numbers. Prices given are list; discounts are available to SAE members and sometimes to libraries and U.S. Government Agencies. Prepayment is required; orders received without payment are subject to a $1 handling charge

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WHEN REQUESTING a document, to be absolutely sure you receive what you order, give the accession number (HS, PB, AD number) or report number (in cases such as an SAE document), title of report, and the personal or corporate author (whichever is cited). When requesting an HS-numbered document from NTIS, add DOT/to the prefix HS-; example HS-800 000 should be ordered as DOT/HS-800 000.

1/0 ACCIDENTS

1/1 Emergency Services

HS-010 573 Fld. 1/1; 1/2

ROAD ACCIDENTS: AN INTRODUCTION TO A DISCUSSION UPON THE TREATMENT OF ROAD ACCIDENT CASUALTIES; MANAGEMENT IN HOSPITAL OF CASUALTIES FROM ROAD ACCIDENTS

by Kenneth C. Easton; P. S. London

Published in *Medical Society of London Transactions* v84 p16-26 (1968)

Presented at a meeting of the Medical Society of London, 23 Oct 1967.

Of 392,454 people involved in road accidents in Great Britain in 1966, 8,000 died. The mortality rate would be greatly reduced if prompt, efficient attention were given to victims immediately at the accident site. The old idea of taking the wounded to the hospital immediately (cared for enroute by police and firemen) must be abandoned. General practitioners should be called instantly to serious accidents so that proper care can be given without delay. A brief description is given of equipment that should be carried on all emergency vehicles and of procedures to be followed in particular types of injuries. At the hospital, the first need is to alleviate threats to life—which may lie in defective breathing or circulation, or in unconsciousness—before full examination and diagnosis.

Search terms: Emergency equipment; Emergency medical services; Ambulances; Postcrash phase; First aid; Medical treatment; Chest injuries; Injuries; Fatality prevention; Airway maintenance; Blood circulation; Injury severity

1/2 Injuries

HS-010 574 Fld. 1/2

SEVERE SHEAR INJURY TO THE BUTTOCKS AND PERINEUM

by I. D. A. Vellar; R. C. Bennett

Published in *Medical Journal of Australia* v1 p222-4 (31 Jan 1970)

Shear injuries to the perineum and buttocks are thought to constitute a serious result of vehicular accidents. Two illustrative cases are described. In view of the severe trauma which usually precipitates these lacerations, multiple injuries are often found which may demand urgent attention. Despite the presence of an intact rectum, fecal diversion is considered to be mandatory in the management of such wounds to assist in nursing, and to reduce the risk of continuing severe infection. Timely skin grafting helps greatly in expediting the healing of the enormous soft tissue defects, the skin being best applied to the open wound. Both illustrative cases had points of additional interest insofar as one patient developed recurrent thyrotoxicosis after injury (thus providing an unusual cause of persistent pyrexia), while the other sustained multiple injuries and developed high-output renal failure.

Search terms: Injury case reports; Ejection caused injuries; Medical treatment; Postoperative care; Perineal injuries; Multiple injuries; Pedestrian injuries; Medical case reports; Female injuries; Buttock injuries

HS-010 575 Fld. 1/2

SEAT BELT FRACTURES

by Henry O. Marsh; Donald Bailey

Published in *Journal of the Kansas Medical Society* v71 p361-5 (Sep 1970)

9 refs

Presented at Annual Meeting, Kansas Chapter, American College of Surgeons, Kansas City, Kansas, 26 Oct 1969.

Seat belt injuries of the lumbar spine can be classified into three categories: dislocation without bone damage, compression fractures of the lumbar spine – these constitute the majority of fractures, Chance fractures – also called "splitting apart fractures," "fulcrum fractures" and "seat belt fractures." Case reports are presented here of three classic Chance fractures. It is concluded that Chance fractures result from high velocity collisions and are primarily due to improperly placed or loose seat belts. The fracture is surprisingly stable and can be treated by bracing or casting in extension; the prognosis for this fracture is excellent.

Search terms: Lumbar spine; Spinal injuries; Seat belt caused injuries; Injury case reports; Spinal fractures; Abdominal injuries; Seat belt positioning

HS-010 576 Fld. 1/2

THE MANAGEMENT OF TRAUMATIC TRACHEO-ESOPHAGEAL FISTULA CAUSED BY BLUNT CHEST TRAUMA

by Niles D. Chapman; Richard A. Braun

Published in *Archives of Surgery* v100 p681-4 (Jun 1970)

26 refs

Presented to Southern California Chapter, American College of Surgeons, Coronado, Calif., 17 Jan 1970.

Tracheo-esophageal fistula following blunt thoracic trauma has been reported; major features of 28 reported cases are summarized. Presence of a fistula must be anticipated when a young male patient has sustained blunt thoracic trauma, usually caused by the steering wheel in an automobile accident. Some time after the third day, the patient

1/2 Injuries (Cont'd.)

HS-010 576 (Cont'd.)

develops difficulty in swallowing and appears to aspirate. An aggressive diagnostic approach relying primarily on endoscopy to localize precisely the site of the fistula is emphasized. Early primary repair of the fistula is recommended.

Search terms: Chest injuries; Diagnosis; Steering wheel caused injuries; Injury case reports; Surgery; Tracheoesophageal fistula

HS-010 577 Fld. 1/2; 3/8

AUDIOMETRIC CONFIGURATIONS ASSOCIATED WITH BLAST TRAUMA

by Darrel L. Teter; Robert C. Newell; Kenneth B. Aspinall

Published in *Laryngoscope* v80 p1122-32 (Jul 1970)

6 refs

Presented at the meeting of the Western Section of the American Laryngological, Rhinological and Otological Society, Inc., Pebble Beach, Calif. 1 Feb 1970.

This paper presents the audiometric configurations associated with blast trauma. A total of 81 ears were tested to give responses that were categorized into four types of audiometric configurations: Type A: 1,000 Hz Dip (36%); Type B: 1,000 and 4,000 Hz Dip (15%); Type C: 4,000 Hz Dip (20%); and Type D: Sloping loss (28%). The averaged audiograms for both air and bone were presented along with associated clinical findings. The authors feel that an awareness of the different types of hearing loss presented by blast trauma is essential to adequate testing and care in any clinical setting.

Search terms: Blast injuries; Hearing tests; Deafness; Ear injuries; Acoustic measurement; Noise tolerances

HS-010 578 Fld. 1/2; 3/12

CRANIAL NERVE AVULSION AND OTHER NEURAL INJURIES IN ROAD ACCIDENTS

by Julian Heinze

Published in *Medical Journal of Australia* v2 p1246-9 (20 Dec 1969)

10 refs

Post-mortem examinations were conducted in 21 cases of fatal road trauma, and damage was found in the second, third, fourth, and sixth cranial nerves, the chiasm, and the extraocular muscles. In discussing the findings, attention is drawn particularly to the following: the variety and extent of the lesions which can occur without a fracture of the skull; the apparent tendency for damage to the ocular motor nerves to occur in their rootlet origins at the brain stem; the possible significance of hemorrhage in and about the third cranial nerve in the superior orbital fissure, and of primary contusion necrosis of this nerve; the position of hemorrhages in the extraocular muscles and their probable sequelae; the difficulty of siting traumatic optic nerve injuries.

Search terms: Nerves; Hemorrhage; Autopsies; Eye injuries; Head injuries; Skull fractures; Injury severity; Head impact tolerance.

1/5 Statistical Data

HS-010 579 Fld. 1/5; 1/2

INJURY LEVEL BY VEHICLE AGE

by Ralph E. Darby, Jr.; James O'Day

Published in *HIT LAB Reports* p13-5 (Sep 1970)

Accident data from Oakland County, Michigan, has been studied to determine accident involvement by vehicle size, vehicle age, vehicle make, and driver age.

Search terms: Accident statistics; Variance analysis; Injuries by vehicle size; Injuries by vehicle age; Injuries by vehicle make; Injury statistics; Injury rates; Accidents by vehicle size; Accidents by vehicle age; Accidents by vehicle make; Driver age; Michigan

HS 010 580 Fld. 1/5; 1/2

ROAD ACCIDENTS IN SWEDEN

by Bertil Aldman

Published in *Journal of Trauma* v10 n11 p921-5 (Nov 1970)

5 refs

The number of cars per 1,000 population is now higher in Sweden than in any other country in Europe. In spite of this high motorization, official statistics indicate that the risk to car occupants and to pedestrians is comparatively low. Figures on seriously injured road users admitted to all hospitals in an area representing approximately one-sixth of Sweden are compared with official statistics based on police-reported accidents. The distribution and severity of injuries on different segments of the body are analyzed for different age groups and categories of road users. Possible effects of preventive measures against road accidents and against injuries caused by such accidents are discussed in relation to the present knowlege of human tolerance to transient dynamic loading and methods for the transfer of momentum between the human body and vehicle structures.

Search terms: Accident rates; Accident statistics; Accident types; Restraint system usage; Restraint system effectiveness; Injuries by age; Injury severity; Injury rates; Fatality rates; Age factor in accidents; Sex factors; Injuries by body area; Injury prevention

HS-010 581 Fld. 1/5; 3/1

CHARACTERISTICS OF ALCOHOL INVOLVEMENT IN MICHIGAN FATALITIES 1966-1969

by James O'Day

Published in *HIT LAB Reports* p4-10 (Oct 1970)

The Automatic Interaction Detector (AID) program was run on data from the Michigan Fatal Accident File for each year from 1966 through 1969. The data show that very frequently drivers involved in fatal accidents in the middle of the night who had been engaged in speeding or driving the wrong way on the road, had been drinking. This may have some implication for selective enforcement in the alcohol control area. It also suggests that in near-midnight accidents, drinking involvement may be a reasonably sensitive indicator of the effectiveness of enforcement programs. It was also found that drivers in the 20-50 year-old group were in the high-drinking group, while younger and older drivers were in the low-drinking group.

Search terms: Automated accident records; Accident statistics; Fatality rates; Drinking drivers; Alcohol usage; Driver intoxication; Time of day; Michigan; Traffic law violations; Driver age; Automatic Interaction Detector Program

2/0 HIGHWAY SAFETY

2/6 Maintenance

HS-010 582 Fld. 2/6; 5/4; 5/11

VEHICLE CORROSION CAUSED BY DEICING SALTS. EVALUATION OF THE EFFECTS OF REGULAR VS. INHIBITED SALT ON MOTOR VEHICLES

American Public Works Assoc.

1970 85p refs
Report no. APWA-SR-34

The test roads in Minnesota were treated with sand, rock salt, and a commercial inhibited salt. Three automobiles were regularly driven on each of three roads during three winters and two spring-summer-fall seasons under controlled conditions. The vehicles were completely disassembled at the conclusion of the field operation to permit a detailed inspection of all parts. These evaluations indicated that up to 50% of vehicle corrosion can be attributed to the action of deicing salt and that the inhibitor used can reduce corrosion somewhat for bright metal parts, but it does not provide protection for major parts of auto body steel.

Search terms: Ice removal; Rock salt; Sodium chloride; Sand; Corrosion tests; Corrosion inhibitors; Road tests; Benefit cost analysis; Minnesota; Chemical damage; Automobile bodies; Corrosion prevention

AVAILABILITY: Corporate author $10.00

3/0 HUMAN FACTORS

3/1 Alcohol

HS-010 583 Fld. 3/1; 1/3

THE ROLE OF ALCOHOL IN COLLISIONS INVOLVING TRUCKS AND THE FATALLY INJURED

by Julian A. Waller

Published in *Archives of Environmental Health* v20 p254-8 (Feb 1970)

5 refs

The role of alcohol was studied in collisions in which drivers of large trucks and pickup trucks were involved either as fatally injured or surviving drivers. Drivers of large trucks almost always were the survivors, usually were not at fault, and probably had not been drinking in any of their crashes. The fatally injured drivers or pedestrians who initiated the crashes commonly had high blood alcohol concentrations. In contrast, drivers of pickup trucks more often were fatally injured in these crashes, frequently were responsible for their crashes, and usually had high blood alcohol concentrations. Police reports were correct less than half the time concerning alcohol when they stated that fatally injured drivers or pedestrians had not been drinking but were responsible for the crashes. However, the police always were correct when they stated drivers or pedestrians had not been drinking and were not responsible for the crashes.

Search terms: Blood alcohol levels; Truck accidents; Truck drivers; Pickup trucks; Driver intoxication; Pedestrian intoxication; Police reports; Accident survivors; Accident responsibility; Drinking drivers; Drinking pedestrians; Driver fatalities; Pedestrian fatalities

HS-010 584 Fld. 3/1; 3/6

DRIVING HISTORIES OF ALCOHOLICS IN A TREATMENT UNIT

by Sheila B. Blume

Published in *Psychiatric Quarterly* v43 p734-43 (1969)

7 refs
Grant PHS-5R20-MH15199

The driving histories and attitudes toward driving and drinking were examined in a group of 92 non-psychotic alcoholics who were voluntary patients in a state hospital rehabilitation program. Eighty-seven percent of the male alcoholics and 61% of the females were or had been drivers. Of this group of drivers, 63% admitted that they had been responsible for one or more accidents while under the influence of alcohol. One-third of all the drivers had allowed their licenses to lapse. One-fourth had had their licenses revoked or suspended. Most had positive attitudes towards compulsory breath testing. Their awareness of driving and drinking as a problem seemed high, and even those who felt they could drive as well under the influence of alcohol as when sober condemned as a whole the practice of driving after drinking. Two-thirds of the drivers would have accepted a driver rehabilitation program

3/1 Alcohol (Cont'd.)

HS -010 584 (Cont'd.)

earlier in the course of their illness, but only 26% thought such a program would have influenced the course of their drinking.

Search terms: Alcohol breath tests; Alcoholism; Driver rehabilitation; Driver license suspension; Driver license revocation; Driver improvement; Accident responsibility; Drinking drivers; Driver attitudes; Problem drivers; Male drivers; Female drivers; Driver records; Driver intoxication

3/2 Anthropomorphic Data

HS-010 585 Fld. 3/2

DEVELOPMENT OF BIOMECHANICAL MANIKINS FOR MEASURING SEAT COMFORT

by Jiro Kohara; Tokio Sugi

Isuzu Motors Ltd. (Japan); Chiba Univ. (Japan

1972 14p 9 refs
Report no. SAE-720006

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A manikin that can simulate the final stable posture of a seated human being has been developed in order to evaluate seat comfort quantitatively and to analyze the biomechanical characteristics of seats. J-SAE 3DM, a manikin with the dimensions of a Japanese 50th percentile person made to imitate the SAE three-dimensional manikin standardized in SAE J826, was employed as the original; three additional joints were installed on its back pan to make it flexible. In this paper, the authors' view of seat comfort, on which their study was based, is summarized. Then the progress of development and various experimental results showing the usability of the final model are outlined. Two and three-dimensional manikins were used.

Search terms: Human body simulation; Seats; Comfort; Biomechanics, Japan; Manikins

AVAILABILITY: SAE

HS-010 586 Fld. 3/2

THE HUMAN BUTTOCKS IN SITTING: PRESSURES, PATTERNS, AND PALLIATIVES

by H. T. E. Hertzberg

Aerospace Medical Res. Lab.

1972 10p 19 refs
Report no. SAE-720005

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

After a brief description of relevant buttock structure, the author presents summary data on buttock size, tuberosity locations, and other dimensions needed for improved seat design, as measured from a sample of 35 young males chosen to approximate the range of USAF flying personnel. Summary load patterns for two angles of seat back (pelvic inclination) are shown, and suggestions to reduce the discomfort of long-continued sitting are made. Curves and data for successful USAF seat surfaces are presented. Citing recent increases in American body size, the author calls for an anthropometric survey on a national sample in which numerous data needed for automotive and other industrial design would be acquired.

Search terms: Seat design; Human body size; Males; Comfort; Anthropometry

AVAILABILITY: SAE

HS-010 587 Fld. 3/2

DRIVING POINT IMPEDANCE CHARACTERISTICS OF THE HEAD

by Richard L. Stalnaker; John L. Fogle; James H. McElhaney

Published in *Journal of Biomechanics* v4 n2 p127-39 (Mar 1971)

14 refs
Contract PH-43-67-1137

Presented at the 4th Annual ASME Biomechanics Technical Conference, Washington, 1-2 Jun 1970.

The mechanical impedance of the human and the monkey (Macaca mulatta) head was determined over the frequency range 30-5000 Hz. Miniature accelerometers and pressure transducers were placed in the brain to measure its response to vibration at constant g-levels and variable frequency. The maximum acceleration studied was 20 g's. In vitro experiments on a fresh human cadaver and in vivo and in vitro experiments on monkeys were performed. The effect of varying blood pressure was investigated as well as the contribution to the mechanical impedance of the scalp, skull, and brain. A linear two-degree-of-freedom model that summarizes the results with acceptable accuracy is presented.

Search terms: Head movement; Biomechanics; Human body resonance; Cadavers in testing; Monkeys; Measring instruments; Test equipment; Mathematical models; Human tissue mechanical properties; Animal tissue mechanical properties; Vibration tests; Blood pressure; Impedance; Degrees of freedom; Damping; Animal acceleration tolerances; Human acceleration tolerances

3/4 Driver Behavior

HS-010 588 Fld. 3/4; 3/6

THE RELATIONSHIP BETWEEN INFORMATION PROCESSING AND DRIVING ACCIDENT AND VIOLATION RECORD

by P. Everett Fergenson

Published in *Human Factors* v13 n2 p173-6 (Apr 1971)

4 refs
Grant PHS-5ROL-UI-00031-01/02

Seventeen subjects matched for driving experience were divided into four groups according to their accident and traffic violation records. They were tested for their ability to process information. Subjects who had a high accident record processed information at a significantly lower rate than nonaccident subjects. Subjects who had many violations, but no accidents, were the best information processors. There was a significant interaction between accident and violation record. These results and their implications are discussed.

Search terms: Decision making; Driver records; Accident proneness; Traffic law violators; Driver performance; Driver reaction time; Accident repeater drivers; Driver experience; Variance analysis; Information theory; Loading (operator performance)

3/5 Driver Education

HS-010 589 Fld. 3/5

DRIVER TRAINING SCHOOLS

by Dorothy Atkin

Published in *Fleet Owner* v64 p66-9 (Aug 1969)

Truck driver training schools are reviewed. A list of schools by state is included. Some advice is given on choosing the proper school: checking with your state association but mostly visiting and talking to instructors, students, and looking over the equipment and driving range.

Search terms: Fleet driver training; Truck drivers

3/6 Driver Licensing

HS-010 590 Fld. 3/6

MEDICAL ASPECTS OF MOTOR VEHICLE ACCIDENTS

by Harold Brandaleone

Published in *New York State Journal of Medicine* v70 p1745-50 (1 Jul 1970)

15 refs

Presented at the 28th Congress on Occupational Health, New York City, 30 Sep 1968.

The role of the physician in preventing motor vehicle accidents is important. He must advice his patient with emotional and physical disabilities: he must perform research, develop medical standards for safe driving, and act as an advisor for medical licensing agencies. He must develop methods of treating and transporting the injured. He must set a good example by good driving habits and use all available safety measures.

Search terms: Disability evaluation; Driver license denial; Driver license standards; Driver mental fitness; Driver physical fitness; Physicians and highway safety; Accident prevention; Medical factors

3/11 Pedestrians

HS-010 591 Fld. 3/11; 1/3

THE STATUS OF PEDESTRIAN SAFETY EFFORTS OF THE DEPARTMENT OF TRANSPORTATION. SPECIAL STUDY

National Transp. Safety Board

1971 18p 39 refs
Report no. NTSB-STS-71-2

Pedestrian fatalities comprise about 18% of all highway fatalities; in metropolitan areas, more than half the highway fatalities are pedestrians. The number, currently about 9,800 annually, has been increasing since 1962. Two age groups account for over half the fatalities: those below 15 and those above 64. Alcohol is heavily implicated in adult pedestrian fatalities. Illumination/visibility appears to be a factor, and also pedestrians' unfamiliarity with the driver's task; many adult victims are not licensed drivers. Pedestrian safety efforts are reviewed. The conclusion is reached that the total pedestrian safety effort of DOT is far below what is warranted by the proportion of highway losses in this category: nearly a fifth of the annual 55,000 fatalities. Recommendations are made for increased efforts on the part of DOT and for coordination of the efforts of different agencies of DOT.

Search terms: Pedestrian safety; Pedestrian fatalities; Pedestrian intoxication; Urban accidents; Pedestrian age; Pedestrian visibility; Pedestrian accidents; Aged pedestrians; Young pedestrians; Drinking pedestrians; Accident causes; Accident factors; Safety program effectiveness

4/0 OTHER SAFETY-RELATED AREAS

4/5 Information Technology

HS-010 592 Fld. 4/5

E-CELL APPLICATIONS FOR THE AUTOMOTIVE INDUSTRY

by Marshall A. Williams; Branko Vranich

EDAX International, Inc.

1972 7p 3 refs
Report no. SAE-720020

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

4/5 Information Technology (Cont'd.)

HS-010 592 (Cont'd.)

Memory and nonvolatile properties of the E-Cell makes it suitable for monitoring a variety of functions of a moving vehicle. Properly programmed, an E-Cell can control engine maintenance periods. It is less than 1/10 in^3 in size and weighs less than 1/10 oz. This small size facilitates the packaging of a sizable monitoring system in a practical volumetric space. The E-Cell, by virtue of its construction, shows no visible signs relating to the amount of information contained in the unit. In addition, the scaling factors used in the supporting circuitry makes the E-Cell compatible with any monitoring program where strict security is required.

Search terms: Electrochemical cells; Electronic monitoring systems; Automotive industry; Miniaturization; Data acquisition; Engine performance

AVAILABILITY: SAE

4/7 Mathematical Sciences

HS-010 593 Fld. 4/7; 5/15; 3/2

MATHEMATICAL MODEL OF AN AIRBAG FOR A THREE-DIMENSIONAL OCCUPANT SIMULATION

by Albert I. King; Clifford C. Chou; James A. Mackinder

Wayne State Univ.

1972 11p 4 refs
Report no. SAE-720036

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A mathematical model of an airbag restraint system for automobile drivers, including the simulation of the simultaneous collapse of the steering column. has been developed. The model is designed to work in conjunction with a three-dimensional occupant model. It is capable of assessing the relative effects of airbag size, pressure, deployment rate, venting area, contact force, steering column collapse force, and column collapse distance. The results of the model are compared with experimental runs in which anthropometric dummies were used as test subjects. Good correlation was obtained for torso kinematics. The model can be conveniently used for a parametric study to aid the design of airbag restraint systems.

Search terms: Mathematical models; Air bag restraint systems; Anthropometric dummies; Occupant kinematics; Parameters; Energy absorbing steering columns; Equations; Computerized simulation

AVAILABILITY: SAE

HS-010 594 Fld. 4/7; 5/18

MODAL MODELING TECHNIQUES FOR VEHICLE SHAKE ANALYSIS

by James C. Davis

General Motors Corp.

1972 12p 5 refs
Report no. SAE-720045

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A modal model is a concise and convenient way to describe the dynamic characteristics of a structural subsystem of vehicle, such as a frame or a body structure. Techniques have been developed for obtaining a modal model by gitting the model to measured frequency responses. These modal models are then used as "building blocks" and coupled to mathematical models of the vehicle's other subsystems (the suspensions, the engine mounting system, etc.) to simulate the total vehicle system. This paper explains the basic theory of modal modeling, including the concepts of mode shape scaling and residual compliances. Some sample vehicle shake simulation studies are also discussed.

Search terms: Vibration analysis; Vehicle dynamics; Mathematical models; Equations; Rigidity; Frequencies; Damping; Frames; Bodies; Automobile modeling; Acceleration response; Flow charts; Simulation models

AVAILABILITY: SAE

5/0 VEHICLE SAFETY

5/1 Brake Systems

HS-010 595 Fld. 5/1

A COMPARISON OF WORLD BRAKING STANDARDS WITH REFERENCE TO THE DEVELOPMENT OF JAPANESE BRAKING STANDARDS

by Kazuhiko Aoki

Akebono Brake Industry Co. Ltd. (Japan)

1972 34p 5 refs
Report no. SAE-720030

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A new Committee on Japanese Automobile Standards for Brakes has been established to issue standards covering road tests, dynamometer tests, nomenclature, etc. This paper discusses several of these. The committee also reviewed the regulations and standards of various countries for comparison purposes. In order to have rational standards, ample data on vehicle usage, analysis of brake characteristics, and study of basic human engineering will be needed. Correlation among road tests, dynamometer tests, and test equipment must be established. Amalgamation of various national standards into a single international standard is a desirable goal.

Search terms: Japan; Brake standards; Road tests; Dynamometers;

Brake tests; International factors; Test equipment; Brake performance; Vehicle usage; Human factors engineering; Truck brakes; Mathematical models; Braking time; Pedal force; Deceleration

AVAILABILITY: SAE

HS-010 596 Fld. 5/1

BRAKE-LINE TUBING

by Bjorn Linder

Published in *Automobile Engineer* v67 n8 p14-7 (Aug 1971)

16 refs

Corroded brake tubes burst on 23,000 cars inspected in Sweden between 1965 and 1970 under a force of 220 pounds applied to the brake pedals. Although it is the most common type of brake tubing used at present, bundy-tubing has insufficient corrosion resistance. The same may be said of welded and weldless carbon-steel tubing. Phosphor-deoxidized copper in semihard condition, dispersion-hardened copper-iron alloy, and stainless steel to specification AISI 316 are the best alternatives. The use of copper and stainless steel tubing can lead to problems with connections and fittings. These problems (including galvanic corrosion) vary according to the design of the car.

Search terms: Brake lines; Brake failures; Brake inspection; Brake materials; Corrosion resistance; Copper alloys; Stainless steel; Sweden; Galvanic corrosion; Parts costs

HS-010 597 Fld. 5/1

CHARACTERIZATION OF CAST IRON FRICTION SURFACES

by S. K. Rhee; R. T. DuCharme; W. M. Spurgeon

Bendix Corp.

1972 8p 16 refs
Report no. SAE-720056

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The friction and wear characteristics of automotive friction materials are strongly dependent on the composition and microstructure of the rotor surface. In this study we investigated the compositional and microstructural changes occurring in the surface layers of cast iron brake rotors during dynamometer tests with a typical organic friction material. Rotors were studied in the as-manufactured, lightly ground and sanded, and as-burnished conditions, as well as after 30 stops from 60 mph at a deceleration rate of 15 ft/s^2. Optical and scanning electron microscopes were used to examine the surfaces. Minimum disturbance of the microstructure was found in the sanded surface, but the as-manufactured and burnished surfaces exhibited considerable disturbance. After the 30 stops the pearlite was transformed locally into martensite. Composition analysis of the burnished rotor surface showed high magnesium content. This was interpreted as asbestos or olivine from the lining, transferred to and embedded in the drum surface. These findings indicate that cast iron rotors in brake systems are not, as commonly envisioned, passive, relatively unchanging parts of the friction couple (as compared with the friction material). Instead, they are metallurgically quite active. For this reason they must be well characterized during tests of friction materials.

Search terms: Friction materials; Dynamometers; Electron microscopes; Scanning electron microscopes; Cast iron; Friction tests; Wear tests; Brake materials; Brake tests; Rotors; Brake drum properties; Photomicrography; Xray.pectrometers; Burnishing; Metal working; Physical properties

AVAILABILITY: SAE

HS-010 598 Fld. 5/1

FUNCTIONAL TESTING OF BRAKE COMBINATION VALVES

by John R. Williams; Marshall W. Struble

General Motors Corp.

1972 7p
Report no. SAE-720091

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The high level of reliability required of safety-related automotive parts, such as brake control system components, demands thorough functional testing of the component. A highly automated test system now in use at a component manufacturing plant helps to provide this reliability by performing 12 separate tests on each brake combination valve produced. The air test and the 11 hydraulic tests are described, features of test system design and operation are discussed, and the test equipment used is listed.

Search terms: Brake tests; Valves; Dual brakes; Hydraulic tests; Air pressure; Test equipment; Reliability; Manufacturing inspection

AVAILABILITY: SAE

HS-010 599 Fld. 5/1

APPROACHING THE STUDY OF FABRICATED STEEL DISC BRAKE ROTORS

by Alex M. Wilson

Armco Steel Corp.

1972 8p 3 refs
Report no. SAE-720055

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

After inconclusive tests of steel brake rotors on a high-performance demonstration car, Armco Steel Corp. decided to

5/1 Brake Systems (Cont'd.)

HS-010 599 (Cont'd.)

take a direct approach in evaluating the application of sheet carbon steels to disc brake construction with production potential. Steel replicas of the normal cast-iron units were tested until an equivalent-performance carbon steel grade was found. Revised prototypes, with design changes, were tested with standard industry testing procedures until performance advantages were observed. Efforts are being made to determine the most efficient and economical way to produce the newly optimized steel rotor. This report is an in-progress review of the direction and first results of this project.

Search terms: Disc brakes; Steel rotors; Brake tests; Carbon steels; Brake performance; Damping

AVAILABILITY: SAE

HS-010 600 Fld. 5/1

DETERMINATION OF WATER IN BRAKE FLUID BY DIFFERENTIAL NEAR INFRARED

by E. Lee Haines

Hollingshead (R. M.) Corp.

1972 4p 4 refs
Report no. SAE-720057

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A rapid differential near-infrared method has been developed to measure the water absorption of heavy-duty brake fluids exposed to the atmosphere during transfer and filling operations. It is based on the -OH combination band at 5180 cm^{-1}. The method has been correlated with the SAE equilibrium reflux boiling point method and can be used in place of it to control line and finished package samples.

Search terms: Brake fluids; Water effect on brake fluids; Infrared analyzers; Measuring instruments; Boiling points; Moisture tests

AVAILABILITY: SAE

HS-010 601 Fld. 5/1

THE EFFECT OF CURE VARIATIONS ON CHEMICAL AND FUNCTIONAL PROPERTIES OF RESIN BONDED FRICTION MATERIALS

by Marvin H. Weintraub; Arnold E. Anderson; Roy L. Gealer

Ford Motor Co.

1972 11p 9 refs
Report no. SAE-720054

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Several resin-bonded friction materials were used to establish the interrelationship between the resin-cure state and the functional properties. Pyrolytic gas chromatography (PGC) was used to measure the cure state of the resin and the Friction Assessment Screening Test (FAST) was used to characterize the friction and wear behavior of the materials. A phenolic resin, an oil-modified phenolic resin, and two different cashew resins were used as binders for simple resin-asbestos composites as used in brake linings. Both the PGC and functional properties of these materials showed systematic variations with changes in cure conditions of the resin. For all resins studied, a linear or bilinear relationship was found to exist between the PGC measured cure state of the resin and wear as measured by the FAST machine. A chemical kinetic model was successfully applied to relate both sample wear and a characteristic PGC peak of the resin to a unique function of cure time and temperature.

Search terms: Friction materials: Resin binders; Curing; Friction Assessment Screening Test; Asbestos; Resins; Time factors; Temperature; Brake lining materials

AVAILABILITY: SAE

HS-010 602 Fld. 5/1

EVALUATION OF THE USE OF AUTOMOTIVE BRAKING SYSTEMS DURING A 7300 MILE CROSS-COUNTRY TRIP

by R. W. Radlinski

National Hwy. Traf. Safety Administration

1972 13p
Report no. SAE-720032

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Use of braking systems in four passenger vehicles was evaluated during a 7300 mile trip across the United States. This paper presents an analysis of braking system temperatures and torques and vehicle speeds and decelerations that were measured during the trip. Similar measurements made during SAE fade and recovery tests are also presented and a comparison of severity levels is given. Requirements for specifying braking system performance at temperatures higher than those currently considered are discussed. The need for a new test to insure that vehicles will perform satisfactorily in service with approved brake fluids is shown.

Search terms: Brake systems; Brake usage; Brake tests; Brake performance: Road tests; Brake temperature; Brake torque; Deceleration: Speed; Brake lining wear; Brake fluids; Brake fade; Mountain driving

AVAILABILITY: SAE

HS-010 603 Fld. 5/1

AN INSTRUMENTATION SYSTEM FOR VEHICLE STOPPING DISTANCE TESTS

by T. M. Atkins; D. P. Renner

Kelsey-Hayes Co.

1972 5p
Report no. SAE-720089

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

An accurate, compact, and convenient instrumentation system for vehicle brake testing has been developed. The system comprises a counter assembly mounted inside the vehicle, a switch that closes at the onset of braking, and a specially modified "fifth wheel." Stopping distance and initial vehicle speed are displayed in numerical form on the face of the counter assembly. Data acquisition is accomplished almost entirely by digital techniques. Measurement accuracy is therefore enhanced by eliminating the usual dependence on analog voltage sealing). Digital techniques also permit useful control (decision-making) functions to be included. One such function is the unique feature of automatically eliminating erroneous distance pickup during vehicle "rock-back" at the end of a high deceleration stop.

Search terms: Stopping distance; Measuring instruments; Brake tests; Fifth wheel devices; Instrumented vehicles; Speed recorders; Digital computers

AVAILABILITY: SAE

HS-010 604 Fld. 5/1; 4/7

A THEORETICAL PREDICTION OF DISC BRAKE TEMPERATURES AND A COMPARISON WITH EXPERIMENTAL DATA

by S. Morgan; R. W. Dennis

Girling Ltd. (England)

1972 6p 8 refs
Report no. SAE-720090

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Disc brake temperatures are predicted by considering the heat flow in two dimensions, allowing for losses by convection and conduction. Heat transfer coefficients are presented from earlier laboratory experiments which studied the effects of air crossflow velocity, rotational speed, and caliper angle, and their interaction. The theoretical results are compared with experimental data from vehicle tests, the differences being a measure of the magnitude of the effects caused by dirt shields, wheels, and body.

Search terms: Brake temperature; Disc brakes; Heat transfer; Laboratory tests; Convention; Thermal conductivity; Air flow; Brake thermal factors; Mathematical models; Finite element method; Body design; Environmental factors; Dirt; Wheels; Brake fade

AVAILABILITY: SAE

HS-010 605 Fld. 5/1; 5/20

FULL POWER HYDRAULIC BRAKE SYSTEM FOR HEAVY-DUTY VEHICLES

by Frank R. Schubert

Bendix-Westinghouse Automotive Air Brake Co.

1972 10p 2 refs
Report no. SAE-720058

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A full power hydraulic brake system has been designed for heavy-duty commercial vehicles. This system uses a hydraulic pump and one or more accumulators to generate and store energy until it is needed for braking purposes. All components have been designed specifically for vehicle braking using standard brake fluid as the energy transfer medium. Mineral oil may be used in the system if the rubber parts are replaced with parts that are compatible with the fluid.

Search terms: Heavy duty vehicles; Commercial vehicles; Hydraulic brakes; Truck brakes; Brake fluids; Brake system design; Mineral oils; Pumps; Energy storage systems; Air brakes; Brake cylinders

AVAILABILITY: SAE

HS-010 606 Fld. 5/1;5/20

DISC BRAKES FOR HEAVY DUTY VEHICLES

by M. E. Markert

Bendix Corp.

1972 12p
Report no. SAE-720060

Presented at Automotive Engineering Congress and Exposition, Detroit, 10-14 Jan 1972.

Disc brakes offer substantial improvements, in most cases, in performance when compared to drum brakes. Coupled with longer life, less and simplified maintenance, they should offer a most attractive brake system to truck owners and operators. Their application to the more demanding service conditions of trucks, compared to passenger cars, seems logical and necessary with greater potential gain than that which was experienced in lighter vehicles. A description of activities in developing such a brake system is given, pointing out the successes and problems encountered.

Search terms: Heavy duty vehicles; Disc brakes; Truck brakes; Brake design; Brake performance; Drum brakes; Brake torque; Brake cylinders; Brake linings; Vehicle weight; Stopping distance; Brake lining wear

AVAILABILITY: SAE

5/4 Design

HS-010 607 Fld. 5/4

EXPERIMENTAL SAFETY VEHICLE CRASHWORTHINESS DESIGN

by William J. Wingenbach; Robert Schwarz

American Machine and Foundry Co.

1972 16p
Report no. SAE-720070

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

In developing the AMF experimental safety vehicle, two of the major problems encountered involved limitation of passenger compartment intrusion during side impacts, and dissipation of vehicle kinetic energy during high-velocity front and rear impacts. A design solution to the first of these problems has been developed, which has as its basic element an aluminum honeycomb sandwich door panel. Several evolutionary models have been built and tested under both static and dynamic loading, including full-scale vehicle crashes. Actual behavior has agreed very well with analytically predicted behavior, enabling the side structure system to meet ESV design goals. The solution developed for the second problem utilizes variable stroke hydraulic buffers to absorb the required energy. Bumper systems incorporating such buffers were tested successfully in various impact configurations at velocities of up to 50 mph. Both analysis and test results led to the conclusion that the ESV crashworthiness goals can be met or exceeded with such systems.

Search terms: Honeycomb structures; Experimental vehicles; Safety cars; Crashworthiness; Safety design; Energy absorbing front structures; Crashworthy bodies; Impact tolerances; Energy absorbing rear structures; Static tests; Impact tests; Dynamic tests; Stress analysis; Mathematical models; Hydraulic bumpers; Energy absorbing bumpers; Door design; Bumper design; Energy absorption; Energy absorbing side structures

AVAILABILITY: SAE

HS-010 608 Fld. 5/4

GENERAL PURPOSE AUTOMOTIVE VEHICLE PERFORMANCE AND ECONOMY SIMULATOR

by William C. Waters

General Motors Corp.

1972 19p 9 refs
Report no. SAE-720043

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

GPSIM is an automotive vehicle simulator that computes the operating conditions of the engine and transmission and the performance and economy of the vehicle as the vehicle is operated in a prescribed manner. The program can simulate a large variety of vehicles. The vehicle to be simulated is described by the user with a combination of steady-state test results and vehicle specifications. The simulator makes predictions from limited data for proposed vehicle combinations, or it makes more accurate computations based on component tests for production vehicles. This paper tells how the simulator computes the operating conditions and how these computations compare with test results. It also describes how engineers using the simulator have decreased developmental lead time, decreased the number of full vehicle tests, and focused developmental work on the best alternatives. The techniques that can be applied in other areas such as the data library control and the command language are described.

Search terms: Computerized simulation; Engine operating conditions; Transmissions; Lead time; Steady state; Driving conditions; Fuel economy; Automobile performance; Mathematical models; Torque; Mathematical analysis

AVAILABILITY: SAE

HS-010 609 Fld. 5/4

FOUR SENSORS FOR MEASURING FLOW QUANTITY IN SHORT IRREGULAR DUCTS

by Thomas P. Yasin

General Motors Corp.

1972 8p 3 refs
Report no. SAE-720101

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

There are many flow problems in which the flow quantity in a short, irregular duct must be measured. A measurement technique which is fast, causes no pressure loss, and can tolerate poor flow quality is often needed. The flow through the radiator duct of a wind tunnel model is one example. Four sensors were tested for velocity response and sensitivity to duct geometry. A full-factorial experiment utilizing a modular simulation of a radiator duct was employed. Two sensors, a propeller anemometer and a long hot wire, seemed to be quite independent of velocity distribution and flow angularity. This report considers the problem of monitoring the internal flow through a wind tunnel model. It is well known that the flow through the cooling system can affect the aerodynamic forces acting on the car. This flow must, therefore, be duplicated.

Search terms: Ducts; Air flow; Aerodynamics; Wind tunnel tests; Measuring instruments; Simulation models; Sensors; Radiators; Mathematical analysis; Variance analysis

AVAILABILITY: SAE

HS-010 610 Fld. 5/4

DIGITEK CHASSIS DEVELOPMENT FOR FAIRCHILD EXPERIMENTAL SAFETY VEHICLE

by Jon S. McKibben; David L. Grossman

Digitek Corp.

1972 13p 2 refs
Report no. SAE-720069

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The development of chassis components to satisfy both formal vehicle reponse specifications and practical requirements of acceptable passenger car performance was undertaken as a part of the Federal experimental safety vehicle program. Since the formal specifications were new and had never been applied to passenger car chassis design, the necessary development effort was challenging and explored new areas of vehicle performance optimization. The chassis configuration resulting from development for these new standards offers dramatic gains in several response and adhesion qualities, while retaining reasonable ride comfort.

Search terms: Experimental vehicles; Safety cars; Chassis design; Automobile performance; Test equipment; Vehicle stability; Automobile handling; Chassis tests; Steering tests; Vehicle control; Chassis specifications; Vehicle riding qualities; Tire selection

AVAILABILITY: SAE

HS-010 611 Fld. 5/4

APPLICATION OF THE SHOCK RESPONSE SPECTRUM TO SOME AUTOMOTIVE CRASHWORTHINESS PROBLEMS

by Sol Davis

Fairchild Industries, Inc.

1972 12p 14 refs
Report no. SAE-720071

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The shock response spectrum is defined and applied to several areas of automotive design and crash test evaluation. An examination of the shock response spectra for several deceleration pulse shapes for vehicle front structure design indicates that there is no "best" input pulse applicable to all occupant/restraint systems. However, in the 8-12 Hz frequency range of current occupant/restraint systems, the square wave does appear to offer significant reduction in peak deceleration response for the fully-restrained occupant. The shock response spectrum method is also used to compare a velocity-sensitive versus constant-force front structure, deceleration data from different vehicles, and accelerometer data having different frequency limits. These examples illustrate that the shock response spectrum can be a useful tool for evaluating particular automotive crash data and for comparing the relative potential damage of deceleration pulses associated with different vehicle designs.

Search terms: Crashworthiness; Shock (mechanics); Impact tests; Automobile design; Deceleration tolerances; Restraint systems; Pressure waves; Degrees of freedom; Barrier collision tests; Stopping distance; Mathematical models

AVAILABILITY: SAE

HS-010 612 Fld. 5/4

APPLICATION ENGINEERING OF A MAINTENANCE-FREE CAPACITOR DISCHARGE IGNITION SYSTEM

by J. T. Hardin; N. F. Sieja

Prestolite Co.

1972 8p 8 refs
Report no. SAE-720008

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

An ignition system with a 3500 h life capability has been developed for tactical military vehicles. An extensive test program was used to develop a capacitor discharge ignition system, composed of a capacitor energy storage system, a noncontacting metal detector timing system, a special coil, shielded ignition cable, and surface gap spark plugs. It provides ignition performance advantages, a single park plug heat range, and is compatible with 4-, 6-, and 8-cyl military engines. The characteristics of various ignition systems were studied on the bench and on the dynamometer over a wide range of engine operation. The final design's capability to provide engine performance equivalent to the standard system was verified. The advantages and disadvantages of each ignition type are discussed.

Search terms: Ignition systems; Military vehicles; Ignition tests; Air fuel ratio

AVAILABILITY: SAE

HS-010 613 Fld. 5/4; 4/5

DYNAMIC TESTING AND COMPUTER ANALYSIS OF AUTOMOTIVE FRAMES

by Jay K. Hay; J. Michael Blew

Structural Dynamics Research Corp.; United States Steel Corp.

1972 25p 10 refs
Report no. SAE-720046

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A method for quick and accurate static and dynamic analysis of automotive frame designs through use of a structural analysis computer program supplemented by empirical test data is discussed in this paper. A special beam finite element used in the computer

5/6 Fuel Systems (Cont'd.)

HS-010 613 (Cont'd.)

program permits more comprehensive and detailed structural description. Specific sub-programs and testing techniques are described briefly. Also presented is a correlation between computer-predicted and actual experimental results for static deflection, and natural frequencies and mode shapes of a representative automotive frame.

Search Terms: Frame tests; Dynamic tests; Static tests; Computerized simulation; Computer programs; Dynamic structural analysis; Structural analysis; Finite element method; Deflection; Frequencies; Mathematical analysis; Stress analysis; Torsion

AVAILABILITY: SAE

HS-010 614 Fld. 5/4; 5/18

FIAT LABORATORY ROAD SIMULATOR

by Enzo Franchini

Fiat Auto-Avio Res. Labs. (Italy)

1972 8p 6 refs
Report no. SAE-720047

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A large facility has been developed in the Fiat Structure Laboratory for performing indoors the fatigue tests usually run on the road. The hydraulic equipment potentiality is such that the severe stresses encountered on a very bad African road can be reproduced on a fully laden truck. The equipment is divided in two independent sections allowing the carrying out, simultaneously, of vibration tests on complete vehicles.

Search terms: Fiat S.p.A. Fatigue tests; Laboratory tests; Hydraulic equipment; Stress measurement; Vibration tests; Road simulators; Test equipment; Dynamic tests; Test facilities; Truck tests; Automobile tests

AVAILABILITY: SAE

5/6 Fuel Systems

HS-010 615 Fld. 5/6

PHOTOCHEMICAL DECOMPOSITION OF LEAD HALIDES FROM AUTOMOBILE EXHAUST

by John M. Pierrard

Published in *Environmental Science and Technology* v3 n1 p48-51 (Jan 1969)

36 refs
Grant PHS-1F3-AP37,293-01

One of the inorganic compounds exhausted by automobiles burning leaded fuel with dibromoethane and dichloroethane as scavengers is the mixed halide, lead bromochloride. The rates of production of chlorine and bromine by photodecomposition of this compound were determined and used to estimate halogen production in a model freeway environment. The further involvement of chlorine in chemical reactions after its conversion to a peroxide free radical is briefly discussed.

Search terms: Halides; Photochemical reactions; Inorganic air pollutants; Chlorine; Bromine; Peroxides; Vehicle air pollution; Leaded gasoline; Air pollutant identification; Halogens; Environmental factors

HS-010 616 Fld. 5/6

IMPROVED FUEL DISTRIBUTION—A NEW ROLE FOR GASOLINE ADDITIVES

by A. A. Zimmerman; L. E. Furlong; H. F. Shannon

Esso Res. and Engineering Co.

1972 10p 8 refs
Report no. SAE-720082

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Problems of fuel maldistribution have been accentuated in late-model cars which use lean carburetion to reduce emissions. This condition has resulted in in creased driveability problems such as hesitation and surge as well as producing losses in pwer and fuel economy. Fuel distribution can be improved by gasoline additives which form a coating of low surface energy in the induction system. As a result of improved distribution, benefits were observed for many cars in driveability, fuel economy, and exhaust emissions.

Search terms: Driveability; Fuel economy; Exhaust emissions; Fuel mixtures; Carburetors; Engine operating conditions; Fuel flow; Fuel additives; Surge; Stalling; Air fuel ratio

AVAILABILITY: SAE

HS-010 617 Fld. 5/6

INFLUENCE OF ATMOSPHERIC HUMIDITY EFFECTING ON NITROGEN OXIDES EMISSION FROM AUTOMOTIVE GASOLINE ENGINES

by Hiroshi Kuroda; Yasuo Nakajima; Isao Murase; Takeji Oguri

Published in *Bulletin of the Society of Automotive Engineers of Japan* n3 p18-26 (Mar 1971)

Atmospheric humidity exerts a significant influence on nitrogen oxides emission from gasoline engines; therefore, it is necessary to establish a correction coefficient with the humidity change. The determination of correction coefficient and analysis of influencing factors by humidity change is described. It is shown that variations in nitrogen oxides emission levels are mainly influenced by air fuel ratio change and water injection effect. Variation of the atmospheric temperature and pressure causes variation of the air fuel ratio. The tests were made in California.

Search terms: Environmental factors; Humidity; Nitrogen oxides; Exhaust emissions measurement; Air fuel ratio; Water injection; Air pressure; Exhaust emission tests; Temperature; California

HS-010 618 Fld. 5/6

THE EFFECT OF SOME FUEL AND OPERATING PARAMETERS ON EXHAUST VALVE SEAT WEAR

by W. L. Kent; F. T. Finnigan

Union Oil Co. of California

1971 10p 7 refs
Report no. SAE-710673

Presented at SAE National West Coast Meeting, Vancouver, 16-19 Aug 1971.

The studies discussed illustrate the potential engine damage in the form of exhaust-valve seat wear that could result from operating cars and trucks on lead free gasoline. This work shows that the inclusion of phosphorus in zero-lead gasoline is not a complete solution to the exhaust-valve seat wear problem, but that as little as 0.5 gm of lead per gallon in gasoline can provide complete exhaust-valve seat wear protection under relatively severe conditions of speed and load. Mechanisms of valve seat wear are discussed. Use of zero-lead gasoline is not recommended except in engines designed for it.

Search terms: Engine wear; Lead free gasoline; Leaded gasoline; Exhaust valve wear; Wear tests; Phosphorus; Engine operating conditions; Fuel additives

AVAILABILITY: SAE

HS-010 619 Fld. 5/6

THE AUTOMOBILE AND AIR POLLUTION

by Richard S. Morse

Published in *Mechanical Engineering* v90 p34-5 (Mar 1968)

The author was chairman of a committee appointed by the Secretary of Commerce, which produced a report on "The Automobile and Air Pollution." He considers that automotive industry characteristics—such as size and importance to the economy, and lack of emphasis on research and innovation, have made emission control difficult. Radical changes in propulsion systems are not yet feasible. But with increasingly stringent standards, industry can meet the public needs for low-cost nonpolluting vehicles and new urban transportation.

Search terms: Vehicle air pollution; Automotive industry; Innovation; Emission standards; Air pollution emission factors; Propulsion systems; Air pollution control

HS-010 620 Fld. 5/6; 4/1

INFLUENCE AND IMPLICATIONS OF EUROPEAN EMISSION LEGISLATION ON GASOLINE LEAD LEVELS

by J. D. Savage; J. L. Addicott; I. A. Fraser

British Petroleum Co. Ltd.

1972 13p 10 refs
Report no. SAE-720083

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

This paper outlines reasons for emission legislation in Europe, makes comparisons with the United States where appropriate, and describes the pace and extent of existing and proposed legislation. It draws attention to variations that exist within the European continent due to national influences. The effect of legislation on the plans of the automotive and petroleum industries is discussed, and the effect of low-lead and unleaded fuel on performance of both existing and projeced engines is considered. An attempt is made to assess the effect of all influences on the North American and European automotive industries and to forecast the general trend in automotive and fuel related developments in Europe over the next 10 years.

Search terms: Automotive industry; Petroleum industry; Europe; United States; Lead free gasoline; Leaded gasoline; Engine performance; Engine operating conditions; Emission standards; Exhaust emission standards; Exports; Octane requirements; Exhaust system laws

AVAILABILITY: SAE

5/9 Inspection

HS-010 621 Fld. 5/9; 5/11; 5/17

DEPARTMENT OF TRANSPORTATION COMMERCIAL VEHICLE ROAD CHECKS AND THE RESULTS OF SUCH INSPECTIONS

by D. W. Morrison; H. E. Seiff

Bureau of Motor Carrier Safety

1972 6p
Report no. SAE-720021

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Inspection and maintenance of motor vehicles are necessary to insure that they are kept in safe condition to operate over the highways. Federal regulations require motor vehicles engaged in interstate and foreign commerce to be systematically inspected and maintained. As a check to determine whether vehicles under the Bureau of Motor Carrier Safety's jurisdiction are being inspected and maintained, their field staff conducts inspections at roadcheck locations around the country. These inspections indicate that many vehicles are not being properly inspected and maintained.

Search terms: Commercial vehicles; Vehicle inspection; Vehicle maintenance; Truck maintenance; Defective vehicles; Truck defects

AVAILABILITY: SAE

5/14 Occupant Protection

HS-010 622 Fld. 5/14

COMPARATIVE ANALYSIS OF CRASH SENSORS

by Trevor O. Jones; Oliver T. McCarter; Robert N. Oglesby

General Motors Corp.

1972 29p 12 refs
Report no. SAE-720035

> Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Techniques and principles for evaluating and comparing various crash sensor concepts are discussed. The trade-off criteria include: crash/rough-road discrimination, target lethality, component reliability, zone of protection, environmental susceptibility, and other criteria. Within the context of hardware performance characteristics, currently prominent devices are described including: inertial mass, spring mass, piezoelectric and piezoresistive accelerometers, radar, sonar, and laser predictive sensors, and bumper mounted detectors. An example of the assessment method is presented, comparing an inertial mass and a spring mass detector. The purpose of the sensor is to activate passive restraints such as air bags.

> Search terms: Sensors; Wind noise; Acoustic measurement; Mathematical models; Safety device costs; Lasers; Detectors; Radar; Air bag inflation time; Environmental factors; Sonar; Reliability; Performance characteristics; Figure of merit; Passive restraint systems; Air bag inflation devices; Air bag restraint systems; Accelerometers; Humidity

AVAILABILITY: SAE

HS-010 623 Fld. 5/14

PERFORMANCE EVALUATION OF AUTOMOBILE HEAD RESTRAINTS

by J. W. Garrett; D. F. Morris

Cornell Aeronautical Lab., Inc.

1972 16p 2 refs
Report no. SAE-720034

> Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Accident cases involving cars without head restraints are compared with cars having this device to evaluate the effectiveness of head restraints, their position when impact occurred, and to provide some details concerning the relationship between occupant position, seat back damage, and cervical injury. A reduction in non-dangerous cervical injury was associated with the head restraint group. However, due to small numbers this could not be confirmed, statistically. Approximately 73% of the adjustable head rests were in their lowest position. The position of the occupant on the seat back was associated with lower injury severity than limited rotation.

> Search terms: Head restraints; Injury severity; Rear seat passengers; Front seat passengers; Passenger injuries; Injuries by seat occupation; Rear end collisions; Restraint system usage; Driver injuries; Neck injuries; Whiplash injuries; Cervical spine; Restraint system effectiveness; Seat backs; Occupant positioning; Injury case reports

AVAILABILITY: SAE

5/15 Propulsion Systems

HS-010 624 Fld. 5/15

A STRATIFIED CHARGE MULTI-FUEL MILITARY ENGINE – A PROGRESS REPORT

by E. Mitchell; M. Alperstein; J. M. Cobb; C. H. Faist

Texaco, Inc.

1972 10p 6 refs
Report no. SAE-720051

> Sponsored by Army Tank-Automotive Command. Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

This paper is a progress report on the conversion of the military L-141 gasoline engine to the Texaco controlled-combustion system and the evaluation of naturally aspirated and turbocharged installations in an M-151 vehicle. Relative to the standard gasoline vehicle, significant improvement in fuel economy with low exhaust emission levels were demonstrated as were the multifuel capabilities and excellent cold starting facility of the combustion concept. Possibilities for further improvement in TCCS exhaust quality through adjustment of operating parameters and add-on devices are also presented.

> Search terms: Jet engine fuels; Controlled combustion systems; Turbocharging; Fuel economy; Fuel combustion; Exhaust emissions; Exhaust emission control devices; Brake performance; Stratified charge engines; Engine design; Engine performance; Tanks (vehicles); Dual fuel vehicles; Engine conversion; Coldstarts; Fuel mixtures

AVAILABILITY: SAE

HS-010 625 Fld. 5/15

A RANKINE CYCLE ENGINE WITH ROTARY HEAT EXCHANGERS

by William A. Doerner; Roy J. Dietz; Oral R. VanBuskirk; Stanley B. Levy; Philip J. Rennolds; Max F. Bechtold

Du Pont de Nemours (E. I.) and Co.

1972 10p 7 refs
Report no. SAE-720053

> Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A Rankine cycle engine is described that comprises close-coupled annular components (boiler, nozzle ring, and air condenser) corotating counter to an interior turbine wheel on a common axis. A stationary annular combustor surrounds the rotating boiler. Test runs up to 18 hp demonstrated several advantages for this kind of Rankine engine, which utilizes centrifugal force to achieve: boiler compactness, air condenser compactness (viscous drag air pumping), automatic condensate return (no separate pump), control simplicity, and few moving parts. The organic working fluid used does not support combustion and has low physiological reactivity in preliminary tests. The results appear significant for uses requiring low-polluting, quiet engines.

Search terms: Rankine cycle engines; Heat exchangers; Engine performance; Engine tests; Condensers; Rotating boilers; Fluids; External combustion engines

AVAILABILITY: SAE

HS-010 626 Fld. 5/15

TEAMING PLASTICS AND AUTOMATION FOR A SUPERIOR BATTERY

by John W. Brodhacker; Howard C. Burns; Albert L. Fox

ESB, Inc.

1972 6p 5 refs
Report no. SAE-720042

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The new "S-T-A-R" battery design take advantage of the properties of thermo plastics in manufacturing a superior battery having the shortest practical electrical path. The injection-moulded three-piece construction provides a lighter, stronger battery case, and the new design concept adapted to automated assembly provides increased resistance to vibration and improved starting power. The new design concept coupled with automatic assembly also makes possible improved quality assurance, a most important factor in meeting the cost effectiveness and uniformity objectives originally conceived. This paper describes such key elements of the design as the fastening of molded-in intercell connectors, molded-in high-profile bushings and terminal posts, and the three-piece construction. The automated assembly operation is described in detail. with individual treatment of sleeve-group assembly, group positioner, heat-sealing reservoirs, first leakage tester, plate lug fusion to sleeve inserts, electric shorts testing, heat-sealing covers, post fusion, and final leakage tester.

Search terms: Battery design; Battery cases; Thermoplastics; Automation

AVAILABILITY: SAE

5/18 Steering Control System

HS-010 627 Fld. 5/18

THE DETERMINATION OF VEHICLE DRAG CONTRIBUTIONS FROM COAST-DOWN TESTS

by R. A. White; H. H. Korst

Illinois Univ.

1972 7p 15 refs
Report no. SAE-720099

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The problem of aerodynamic and rolling resistance characteristics of cars and trucks is of considerable importance to vehicle engineers as the two major contributions to external vehicle drag. Many testing methods have been developed including wind tunnel testing of scale models, testing of full-size production cars, and coast-down testing. The advantages and disadvantages of each method are discussed and analyzed.

Search terms: Aerodynamic configurations; Automobile tests; Coast down tests; Drag; Mathematical analysis; Body aerodynamics

AVAILABILITY: SAE

HS-010 628 Fld. 5/18

A STUDY OF VEHICLE VIBRATION SPECTRA AS RELATED TO SEATING DYNAMICS

by L. F. Stikeleather; G. O. Hall; A. O. Radke

Universal Oil Products Co.

1972 35p 40 refs
Report no. SAE-720001

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Some new vehicle ride vibration data is presented. The Janeway recommended limit, Pradko/Lee absorbed power, and Mil-Std-1472A (proposed ISO tolerance criteria) provide formats for the data presentation. A brief literature review of the subjective tolerance question is included. The importance of seating systems which attenuate vehicle vibration is demonstrated.

Search terms: Vibration; Reviews; Seat design; Sinusoidal vibration tolerances; Road tests; Automobile tests; Instrumented vehicles; Mathematical models; Human acceleration tolerances; Vehicle riding qualities; Vehicle dynamics

AVAILABILITY: SAE

HS-010 629 Fld. 5/18

MOTION OF A MOTOR VEHICLE RUNNING ALONG A CURVE

by Tokio Sugi

Published in *Bulletin of the Society of Automotive Engineers of Japan* n3 p54-63 (Mar 1971)

4 refs

5/18 Steering Control System (Cont'd.)

HS-010 629 (Cont'd.)

This paper shows a method of analyzing general curvilinear motions of a motor vehicle, supposing that the center of gravity point of the vehicle traces on a given curve. This paper deals with the device designed and developed for the actual measurement of the relations between the curvature of a locus of center of gravity point and the length of the curve. Then it explains the theoretical equations introduced and discusses the validity of them by performing the calculations of an actual case. Finally, it discusses a method of applying this theory to the analysis of general curvilinear motions by using a new defined mitigative curve.

Search terms: Road curves; Road tests; Vehicle dynamics; Vehicle center of gravity; Vehicle control; Mathematical models; Computerized simulation; Turning; Measuring instruments; Motion effects; Flow charts

HS-010 630 Fld. 5/18

MOTION SIMULATION AND ITS APPLICATION TO RIDE DYNAMICS RESEARCH

by W. F. Lins; H. Dugoff

Army Tank-Automotive Command

1972 9p 10 refs
Report no. SAE-720003

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

This paper describes two motion simulators and their application in research in whole-body vibration. One is a four-degree-of-freedom device capable of producing vertical, pitch, roll, and yaw motions. The other is a single-degree-of-freedom device that produces motion in the horizontal direction. Both have been used to acquire information on whole-body and visual response to vibration. Frequency response plots of some of the acquired data are presented. Procedures for assessing the severity of human vibration responses in terms of absorbed power are described and discussed. Brief descriptions are presented of studies that made use of the equipment and methodology discussed. Th first is a concept evaluation of a proposed vehicle for use on the lunar surface. The second is a hardware evaluation of two seating devices for use in a wheeled vehicle in severe terrain environment.

Search terms: Ride simulators; Roll; Yaw; Degrees of freedom; Pitch; Vibration; Vehicle dynamics; Sinusoidal vibration tolerances; Off the road vehicles; Lunar vehicles; Vehicle riding qualities; Mathematical models; Transfer functions; Visual acuity; Laboratory tests; Driver performance under stress

AVAILABILITY: SAE

HS-010 631 Fld. 5/18; 5/4

NISSAN FULL-SCALE WIND TUNNEL–ITS APPLICATION TO PASSENGER CAR DESIGN

by Kenichi Ohtani; Michio Takei; Hikota Sakamoto

Nissan Motor Co. Ltd. (Japan)

1972 19p 4 refs
Report no. SAE-720100

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

In the development of high-speed automotive vehicles, wind resistance and vehicle stability characteristics, particularly aerodynamic lift and side-force effects, must be better understood. For this purpose and other uses. the Nissan Motor Co. has constructed a new full-scale wind tunnel now in operation at its Oppama Proving Ground. The new wind tunnel has been used for experimental studies of the factors contributing to the aerodynamic characteristics of passenger car bodies, and the results are described. The authors have also clarified the relationship between aerodynamic characteristics and high-speed road performance. The effect of minor changes in car shape, with various attachments, has been investigated. Finally, the principle of a rear spoiler is treated both theoretically and experimentally at some length.

Search terms: Wind tunnel tests; Proving ground tests; Vehicle stability; Wind forces; Aerodynamic configurations; Automobile performance; Automobile design; Body aerodynamics; Lift; Drag; Yaw; Roll; Pitch; High speed; Flow charts; Speed patterns; Mathematical models; Wind velocity; Spoilers

AVAILABILITY: SAE

HS-010 632 Fld. 5/18; 5/4; 4/7

AN ANALYTICAL METHOD TO STUDY THE MANEUVERABILITY OF AUTOMOBILES AGAINST SIDE WIND GUST

by Katsuji Takanami; Takashi Kitahara; Toshiaki Sakai

Published in *Bulletin of the Society of Automotive Engineers of Japan* n3 p75-81 (Mar 1971)

5 refs

The specifications of a side wind gust test facility are explained briefly, then the running paths of vehicles having different shapes are shown as an example of measurements. A theoretical consideration was developed employing the equations of motion with four degrees of freedom, for which the aerodynamic input function has been estimated by static test results using the device.

Search terms: Wind forces; Crosswind; Equations of motion; Yaw; Automobile stability; Vehicle dynamics; Automobile handling; Proving ground tests; Test facilities; Wind velocity; Lateral force; Aerodynamics; Degrees of freedom; Mathematical models

HS-010 633 Fld. 5/18; 5/20

THE HYDRAIR II TRUCK SUSPENSION

by J. J. France; R. D. Star

Westinghouse Air Brake Co.

1971 7p 2 refs
Report no. SAE-710708

Presented at the National Farm, Construction and Industrial Machinery Meeting, Milwaukee, 13-16 Sep 1971.

Air over oil, oleopneumatic suspensions were first introduced into Wabco off-highway Haulpak trucks in 1957. The Hydrair suspension system was developed to function as a soft spring and shock absorber for off-highway construction vehicles, providing better operator control, increased vehicle life, and reduced shock loads. This paper deals with the development of the latest generation of this suspension, which is much simpler in design, has longer life, higher reliability, and still maintains the desirable features contained in the original Hydrair suspension.

Search terms: Suspension systems; Front suspension systems; Rear suspension systems; Shock absorbers; Damping; Construction vehicles; Performance characteristics; Off the road vehicles; Vehicle control; Hydrair

AVAILABILITY: SAE

5/20 Trucks and Trailers

HS-010 634 Fld. 5/20; 4/7; 5/18

SIMULATION OF SIDEWAYS OVERTURNING OF WHEEL TRACTORS ON SIDE SLOPES

by Dennis Larson; J. B. Liljedahl

Nebraska Univ.; Purdue Univ.

1971 9p 20 refs
Grant HEW-UI-0064-03
Report no. SAE-710709

Presented at the National Farm, Construction. and Industrial Machinery Meeting, Milwaukee, 13-16 Sep 1971.

A mathematical model which predicts when a wheel tractor will overturn sideways is discussed. In addition to the usual tire and tractor parameters, this model also considers the slope, turning radius, bump height, and side forces on the tires. The mathematical model predicted some overturns which actually did not occur during experimental tests.

Search terms: Mathemetical models; Rollover tests; Farm tractors; Farm tractor accidents; Tractor tires; Tire soil interface; Vehicle stability; Tire side forces; Accident risk forecasting; Slopes; Ground roughness; Turning radius

AVAILABILITY: SAE

5/22 Wheel Systems

HS-010 635 Fld. 5/22

RECENT TRENDS IN TYRE COMPOUNDING

by E. R. Gardner

Published in *Institution of Rubber Industry Transactions and Proceedings* v13 p248-60 (Dec 1966)

In recent years there has been a considerable diversification in the compounds employed by the various companies in the different parts of the tire. Reasons for this are suggested. The main features of the compounds used in the tread, sidewalls, and casing of truck and car tires, both cross-ply and radial, are discussed.

Search terms: Tire materials; Rubber compounds; Tire casings; Tire characteristics; Tire performance; Tire treads; Radial tires; Tire sidewalls; Tire wear; Cracking; Truck tires; Crossply tires; Polybutadiene; Tires

HS-010 636 Fld. 5/22

MAKING A ROAD SIMULATOR SIMULATE

by Ronald A. Cripe

General Motors Corp.

1972 13p 8 refs
Report no. SAE-720095

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

This paper defines a laboratory road simulator system and discusses various problems associated with using such a machine to test vehicles. Advantages and disadavantages of various methods for applying input forces to the vehicle are discussed to show why the author chose the method of exciting through the tire in the vertical direction only. The development of a method for solving the problem of simulating the rolling tire vertical properties is presented. Vertical and fore-aft response correlation resulting from this tire simulation is shown and the types of problems the author has chosen to study with this test system are explained.

Search terms: Road simulators; Tire road contact forces; Lateral force; Laboratory tests; Tire force measurement; Mathematical analysis; Tire profile measurement; Tire deflection; Tire properties; Road tests; Tire riding characteristics

AVAILABILITY: SAE

NHTSA DOCUMENTS

NHTSA Contractors Reports

HS-800 596 Fld. 3/1; 2/8; 4/1

ALCOHOL ENFORCEMENT COUNTERMEASURES INSTRUCTOR'S MANUAL

International Assoc. of Chiefs of Police

NHTSA Contractors Report (Cont'd.)

HS-800 599 (Cont'd.)

1971 384p
Contract DOT-HS-036-1-042
Report no. PB-205 662

Materials intended for the instructor's use in the training program designed for the alcohol enforcement countermeasures program are presented. Materials are based upon the information in the Alcohol Safety Action Program Enforcement Countermeasure Manual. It is a 40-hour course set forth in 11 major topical areas of the Alcohol Enforcement Countermeasures Program. Each of the 11 chapters comprising the manual consists of two-part lesson plans and course content. There are 40 lesson plans, one for each hour of course instruction, and a guide to the materials which will be covered in class. The course content consists of the material to be covered in class.

> Search terms: Alcohol education materials; Curricula; Instruction materials; Police training; Police law enforcement responsibilities; Police co-operation with other agencies; Alcohol laws; Community support of police; Instruction manuals; Alcohol effects; Drinking drivers; Driver intoxication; Problem drivers; Police motorist contacts; Alcohol usage deterrents; Alcohol chemical tests; Implied consent laws; Legal factors; Uniform Vehicle Code; Blood alcohol levels; Alcohol breath tests

AVAILABILITY: NTIS as PB-205 662

HS-800 600 Fld. 3/1; 3/4; 3/6

ALCOHOL AND HIGHWAY SAFETY: BEHAVIORIAL AND MEDICAL ASPECTS. SUMMARY REPORT

by M. W. Perrine; Julian A. Waller; Lawrence S. Harris

Vermont Univ.

1971 30p
Contract FH-11-6609; FH-11-6899
Report no. PB-205 894
Report for Jun 1967-Dec 1969.

Drivers involved in fatal and serious injury highway crashes were compared with drivers stopped at roadblocks on the same roads at similar times, drivers with recent drunken driving arrests, drivers arrested for other serious traffic violations, and clear-record drivers. Blood alcohol levels of 100 mg% were found in 42% of the driver fatalities, 2% of the roadblock drivers, and none of the clear-record drivers. A discriminant function analysis, based on four variables, correctly identified 95% of clear-record drivers and 87% of drunk drivers. Induced-intoxication experiments were conducted to study influences of alcohol upon driving-related behavior.

> Search terms: Accident factors; Alcohol effects; Driver behavior; Driver intoxication; Driver performance; Driver records; Problem drivers; Medical factors; Vermont; Drinking drivers; Blood alcohol levels; Driver characteristics; Alcohol usage; Traffic law violators

AVAILABILITY: NTIS as PB-205 894

HS-800 605 Fld. 5/14; 3/8

TEST RESPONSE OF IMPROVED SAFETY AIR CUSHION SYSTEM. FINAL REPORT.

by Bernard Mazelsky

Aerospace Res. Associates, Inc.

1971 45p 3 refs
Contract FH-11-7624
Report no. ARA-142; PB-205 850

Report for Jan-Nov 1971.

A static inflation test and a dynamic crash test were conducted to demonstrate the ARA system's ability to protect the front passenger of an automobile during a frontal impact of 30 mph and significantly reduce the noise level over the Eaton system. Results of the static inflation test showed that the Eaton system had a peak noise level 2.24 times higher than the ARA system and average noise level 1.78 times higher. During the crash test, all injury indicating parameters (femur loads, severity index, etc.) were well below their allowed maximum levels. The system demonstrated the desired controlled directional response by contacting and restraining the upper torso of the dummy occupant.

> Restraint system effectiveness; Head on impact tests; Impact forces; Noise; Air bag restraint systems; Test equipment; Injury prevention; Anthropometric dummies; Loads (forces); Acoustic measurement; Photography; Static tests; Dynamic tests;

AVAILABILITY: NTIS as PB-205 850

NHTSA Staff Speeches, Papers, etc.

HS-810 187 Fld. 3/1

ALCOHOL AND THE DRINKING DRIVER

by Marjory Rone

National Hwy. Traf. Safety Administration

1971 8p

> Presented at Iowa Women's Traffic Safety Council annual meeting, Des Moines, 4 Dec 1971.

About 360 deaths a week occur at the hands of drinking drivers – tolerated by an apathetic public. Because accident risks soar when blood alcohol levels rise, alcohol countermeasures have highest priority among safety programs. There are now 35 Alcohol Safety Action Projects, federally funded to start community action. Program results are promising as research, private, and public agencies join the fight, but help is most needed from concerned citizens.

Search terms: Drinking drivers; Alcohol education; Community support; Alcohol usage deterrents; Alcohol Safety Action Projects; Blood alcohol levels

AVAILABILITY: NHTSA

HS-810 188 Fld. 5/16

TRAFFIC SAFETY GOALS OF MOTOR VEHICLE REGISTRATION

by Joseph P. Grillo

National Hwy. Traf. Safety Administration

1971 18p

The present motor vehicle registration standard does not reflect the highway safety benefits that could be derived. This paper proposes nationwide development of a uniform central system in each state to advance such vehicle registration safety goals as: rapid identification of vehicles and owners; theft prevention and recovery of stolen vehicles; controlling vehicle use to insure safe condition of vehicles; controlling vehicle use by problem drivers; reduction of rear end crashes at night; increasing administrative effectiveness.

Search terms: Vehicle registration; Driver identification; Theft prevention; Stolen vehicles; Vehicle identification numbers; Defective vehicles; Problem drivers; Rear end collisions; Reflectorized license plates; Automobile safety standards

AVAILABILITY: NHTSA

NHTSA Imprints

HS-820 171 Fld. 5/17; 5/2

SCHOOL BUS SAFETY PROBLEMS

National Hwy. Traf. Safety Administration

1971 64p

About 1,000 school buses were inspected during 1970 field surveys to determine effectiveness of recall campaigns. Defects and failures discovered involved brakes, clutch controls, exhaust systems, fire hazards, heater hoses, door and hood latches, engine mounts, steering, and suspension. Nine recall campaigns have been instituted by three chassis manufacturers for the correction of safety problems on about 203,600 school buses and trucks. This booklet provides photographs of the safety hazards for school bus inspectors and operating personnel.

Search terms: Truck recall campaigns; Bus defects; School bus safety; School bus chassis; School bus recall campaigns; Defect correction; Brake failures; Bus inspection; Photographs; Steering systems; Bus maintenance; Clutches; Brake systems; Exhaust systems; Fire prevention; Heaters; Door latches; Hood latch systems; Engine mounts; Suspension systems

AVAILABILITY: NHTSA

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